

trenches formed in the epitaxial layer and the drift layer to extend from a surface of the epitaxial layer into the drift layer, the trenches having bottom portions surrounded by the drift layer;

gate electrodes buried in the trenches with gate insulating films interposed between walls of the trenches and the gate electrodes;

low resistive source layers of the first conductivity type formed in a surface region of the epitaxial layer adjacent to the gate insulating films;

Q1 a base layer of a second conductivity type formed in the surface region of the epitaxial layer;

a source electrode electrically connected to the source layers and the base layer; and

a drain electrode electrically connected to the second main surface of the semiconductor substrate, wherein

the drift layer has an impurity concentration higher than that of the epitaxial layer and the epitaxial layer intervening between the trenches is depleted in a case where no voltage is applied between the source electrode and the gate electrodes.

---

10. (Amended) A power MOSFET, comprising:

Q2 a low resistive semiconductor substrate of a first conductivity type having a first main surface and a second main surface opposing to each other;

a high resistive epitaxial layer of the first conductivity type formed on the first main surface of the semiconductor substrate;

trenches formed to extend from a surface of the epitaxial layer to the semiconductor substrate, the trenches having bottom portions surrounded by the semiconductor substrate;

gate electrodes buried in the trenches with gate insulating films interposed between the gate electrodes and walls of the trenches;

low resistive source layers of the first conductivity type formed in a surface region of the epitaxial layer adjacent to the gate insulating films;

Q2 a base layer of a second conductivity type formed in the surface region of the epitaxial layer;

a source electrode electrically connected to the source layer and the base layer; and

a drain layer electrically connected to the second main surface of the semiconductor substrate, wherein

the semiconductor substrate has an impurity concentration higher than that of the high resistive epitaxial layer and the epitaxial layer intervening between the trenches is in a state of being depleted in a case where 0 volt is applied between the source electrode and the gate electrodes.

---

14. (Amended) A power MOSFET, comprising:

a low resistive semiconductor substrate of a first conductivity type having a first main surface and a second main surface opposing to each other;

Q3 a drift layer of the first conductivity type formed on the first main surface of the semiconductor substrate;

a high resistive epitaxial layer of the first conductivity type formed on the drift layer;

trenches formed to extend from a surface of the epitaxial layer into the semiconductor substrate, the trenches having bottom portions surrounded by the semiconductor substrate;

gate electrodes buried in the trenches with gate insulating films interposed between the gate electrodes and walls of the trenches;

low resistive source layers of the first conductivity type formed in a surface region of the epitaxial layer adjacent to the gate insulating films;

a base layer of a second conductivity type formed in the surface region of the epitaxial layer;